

WHAT IS CLAIMED IS:

1. An engine valve actuation system comprising:
 - a housing having a first slave piston bore, a second slave piston bore, and a passage adapted to provide hydraulic fluid to the first and second slave piston bores;
 - a first slave piston slidably disposed in the first slave piston bore and a second slave piston slidably disposed in the second slave piston bore;
 - a master piston operatively connected to the housing passage; and
 - a hydraulic fluid control valve operatively connected to the housing passage.
2. The system of Claim 1, further comprising a valve bridge disposed between (i) the first and second slave pistons and (ii) first and second engine valves.
3. The system of Claim 1, further comprising a valve seating device disposed in the housing passage.
4. The system of Claim 3 wherein the valve seating device comprises:
 - a hydraulic fluid opening adapted to provide hydraulic communication between (i) the housing passage and (ii) the first and second slave piston bores; and
 - means for selectively occluding the hydraulic fluid opening.
5. The system of Claim 3 wherein the valve seating device is disposed substantially directly above the first slave piston.

6. The system of Claim 5 wherein the second slave piston has a greater mass than the first slave piston.
7. The system of Claim 3 wherein at least one slave piston is solid throughout.
8. The system of Claim 3, further comprising a valve bridge disposed between (i) the first and second slave pistons and (ii) first and second engine valves.
9. The system of Claim 1 further comprising:
a yoke extending between the first and second slave pistons; and
a valve seating device disposed between the yoke and the housing.
10. The system of Claim 9 wherein the first and second slave pistons include means for engaging the yoke as the slave pistons slide into the first and second slave piston bores.
11. The system of Claim 9 wherein the valve seating device is connected to the yoke.
12. The system of Claim 9 wherein the valve seating device is connected to the housing.

13. The system of Claim 2 further comprising a valve seating device disposed between the valve bridge and the housing.

14. The system of Claim 13 wherein the valve seating device is connected to the valve bridge.

15. The system of Claim 13 wherein the valve seating device is connected to the housing.

16. The system of Claim 13, further comprising:

a guide member extending upward from the valve bridge; and

a guide bore provided in the housing, said guide bore having an end wall and being adapted to receive the guide member,

wherein said valve seating device is disposed between the guide member and the guide bore end wall.

17. The system of Claim 16 wherein the valve seating device is connected to the guide member.

18. The system of Claim 16 wherein the valve seating device is connected to the guide bore end wall.

19. The system of Claim 1 wherein the first slave piston is axially aligned above a first engine valve, and the second slave piston is axially aligned above a second engine valve.
20. The system of Claim 2 wherein the first and second slave pistons are disposed above the valve bridge at central locations relative to the locations at which the valve bridge contacts the first and second engine valves.
21. The system of Claim 1 wherein the valve actuation system is a variable valve actuation system.
22. The system of Claim 1 wherein the valve actuation system is a fixed timing valve actuation system.
23. A method of actuating two or more engine valves in an internal combustion engine using a system having a master piston hydraulically linked to two or more slave pistons, comprising the steps of:
- imparting a linear motion to the master piston;
 - imparting a linear motion to the two or more slave pistons responsive to the master piston motion;
 - actuating the two or more engine valves responsive to the motion of the two or more slave pistons; and

seating the two or more engine valves by hydraulically opposing the linear motion of the two or more slave pistons as the engine valves approach valve seats.

24. An engine valve actuation system comprising:

a valve train element;

a master piston operatively contacting the valve train element;

a plurality of slave pistons linked to the master piston by a hydraulic circuit;

a variable valve actuation trigger valve operatively connected to the hydraulic circuit; and

one or more engine valve elements operatively contacting the plurality of slave pistons.

25. The system of Claim 24 wherein the one or more engine valve elements comprise a valve bridge.

26. The system of Claim 24 wherein the one or more engine valve elements comprise an engine valve stem.

27. The system of Claim 24 wherein the plurality of slave pistons comprise three or more slave pistons.

28. The system of Claim 3 wherein the valve seating device is integrated into the first slave piston.